HEALTHY COASTAL ECOSYSTEMS FOCUS TEAM

CLIMATE IMPACTS

OCTOBER 2009

110 ALASKA: Sea Grant-NOAA research studied the ecological role of marine mammals and their response to a changing environment

Activity Summary: Alaska Sea Grant supported MAP's marine mammal specialist while collaborating on the Gulf Apex Predator-prey project, a NOAA-funded study of the seasonal and interannual variability in prey availability and use by Kodiak's apex marine predators. Results showed that the diets and distribution of Kodiak's endangered marine mammals are diverse and flexible, responding to temporal changes in environmental conditions and local prey availability. Impact Statement: Ecosystem-based marine resource management relies on understanding both the structural components of the system and the functional mechanisms of their interactions. By monitoring the seasonal distribution and abundance of predators and their prey, GAP studies have illuminated how changes in coastal climate and commercial harvests may affect endangered marine mammals and other apex predators in Alaskan waters. As a multi-year study, GAP is developing the time-series needed to explore and anticipate effects of environmental change on primary and secondary production in a coastal marine ecosystem. *[(ebm mod cli end)]*

947 ALASKA: Alaska Sea Grant increased awareness of paralytic shellfish poison and harmful algal blooms

Activity Summary: A decades long PSP awareness and education outreach effort has been successful in limiting PSP illnesses among Alaskans and visitors. During this reporting period, MAP held five workshops, two training sessions, and a presentation at the Alaska Health Summit. Impact Statement: During 2007, there was one reported PSP illness. This is the lowest level of illness recorded since formal testing began in 1973. Residents of Kodiak Island, where subsistence shellfish gathering has been culturally important, have largely avoided shellfish in large measure because of the education and outreach efforts conducted there. Activity Summary: MAP was a co-PI on a North Pacific Research Board funded project titled, Response and Intervention System for Climate Change Induced Paralytic Shellfish Poisoning (PSP) in Aleut Communities, PSP Monitoring and Outreach. During the two years of the project, nine community technicians were trained in the standard operational procedure for sampling, storing, testing, and shipping of shellfish samples. About 150 samples were tested from nine species of shellfish. Outreach included reports delivered to over 500 persons in 19 communities and progress posted on five Web sites. Impact Statement: This project extended the range of known PSP occurrence in shellfish ranging from King Cove, Alaska, to the Commander Islands, Russia. PSP values are now available for subsistence harvest shellfish species not previously tested. Communities received and were receptive to the information provided. A sustained monitoring program was established in King Cove. This monitoring program is significant because residence of this small community of 150 residents regularly ship their harvest to communities as far away as Seattle, and to an estimated 1,000 Native American shellfish consumers. In 2007, after detecting PSP in Bering Sea blue mussels and surf clams, King Cove voluntarily suspended shellfish shipments. *[(hab dis wq fish train cli)]*

1106 ALASKA: Alaska Sea Grant helped researchers inform local residents about studies in their area

Activity: (Brewer) In 2008, ten talks were given in Unalaska with approximately 300 total attendance to bridge the gap between community members and researchers. Impact Statement: The primary impact of this ongoing series is a trust that has developed between locals and researchers where locals receive information from researchers, and also provide information to the researchers. Prior to this series, locals

believed researchers were being secretive by not sharing their work and the impacts. This series has brought to light that researchers are willing to put in the time to talk about their research and that local input is valuable. Local organizations are competing to host this series to include the Museum of the Aleutians, the Grand Aleutian Hotel, the World War II Interpretive Center, and the local high school auditorium. The secondary impact of this series is that, for many of the researchers, locals attending these talks become future contacts for follow-up information and assistance. As an example, in 2008, Philip Loring (University of Alaska Fairbanks Department of Anthropology) gave a talk on "The impacts of climate change on coastal resources." Many stakeholders attended this talk and follow-up interviews were held with interested participants. In July 2009, Loring returned to Unalaska and used those same stakeholders for input about another project dealing with "The impacts of crab rationalization on local fishermen." *[A/152-20 (cli edu)]*

20 CALIFORNIA: Baseline Studies of Marine Protected Areas

California Sea Grant researchers identified the population structure of cabezon (one of the most economically important fisheries in Central California); they also mapped the movements and home ranges of spiny lobsters and of two key sport fishes, and examined the effects of climate change on fish assemblages. Another group of studies collectively provided a snapshot of key species in rocky intertidal, mid-depth and deep waters off Central California, providing a baseline for detecting changes in fish sizes and abundances within and outside of no-take zones. A socio-economic study of the effects of the Central Coast MPAs was also conducted. California Department of Fish and Game is using the research to monitor the newly created Central Coast Marine Protected Areas and to help plan future MPA networks. These results should be of great benefit to state resource managers and in designing future reserves. Based on the research, resource managers should be able to predict site fidelity and home range sizes based on benthic habitat maps for the key species studied. This may allow managers to design reserves that facilitate fisheries by allowing for more catch along reserve boundaries or restricting fishing access by placing boundaries at distances greater than 100m from the rock/sand boundary. This information directly fits in the NOAA Ecosystem Research Program performance measure III (tools) by providing a means for managers to use benthic habitat maps to predict MPA size, shape, and habitat composition for the four species studied. This information will also be of interest to fishers who will now have more concrete evidence that MPAs with particular habitat types may provide good protection for certain species and that managers will now have better tools to tailor MPA design to meet particular management objectives. *[(fish ebm cli prot)]*

1289 HAWAII: Sea Grant Case Study on Climate Change, Water Resources and Sustainability in the Pacific Basin Goes to Press

Climate Change, Water Resources, and Sustainability in the Pacific Basin: Emphasis on Oahu, Hawaii and Majuro Atoll, Republic of the Marshall Islands, a water and climate case study, has been published in print and digital form. *[E/ET-49 (cli)]*

490 MICHIGAN: Sea Grant Pilots NOAA Model for Regional Collaboration

Michigan Sea Grant is piloting a position to implement a regional NOAA partnering approach linking Sea Grant programs with other NOAA entities in the Great Lakes basin. Since her appointment, the Sea Grant regional extension educator has coordinated fisheries extension enhancement projects for the region and led programs on aquatic invasive species. She was recently successful in developing and garnering NOAA funding for a collaborative partnership involving GLERL, the Cooperative Institute for Limnology and Ecosystem Research (CILER), and Sea Grant to study and communicate the impact of climate change to coastal stakeholders who are coping with planning for the potential impacts to coastal infrastructure. *[(inv cli)]*

560 MICHIGAN: Sea Grant Publications Promote Stewardship of the Great Lakes

Michigan Sea Grant distributed a total of 116,000 web and print publications to targeted users in 2008, including 12,000 copies of the upwellings newsletter, 3,500 pdf publications and 16,500 additional print publications from its bookstore. 84,000 visits were made to specific pages on Michigan Sea Grant's website. The website continues to grow as new sections are added about coastal habitats, climate change, medical waste disposal, and integrated assessment. Popular web pages about invasive species, fisheries, and Sea Grant's K-12 resources continue to draw visitors. *[(cli wq edu)]*

1408 NEW YORK: Sea Grant helps to identify areas of collaboration regarding climate science for coastal constituencies

Through a series of meetings between NSGO the NOAA Climate Program Office, a plan was developed to initiate a national climate outreach effort by the Sea Grant Extension Program. An internet survey on "Climate Outreach" was carried out with the 30 Sea Grant Extension Programs identifying strong interest within SG Extension and resulted in an April 2007 national workshop on Climate Science and Services: Coastal Applications for Decision Making through Sea Grant Extension and Outreach. IMPACT: The workshop identified potential applications for research and information products, critical needs for climate-related decision support (e.g., climate information, products, and training related to climate impacts and adaptation methodologies); and opportunities for collaboration (e.g., climate extension programming, training, partnerships with regional/state climate offices) that use climate science and services to support decision making and sound coastal management. A major product of this workshop was the development of a website: http://www.csc.noaa.gov/sgcw/index.html used by the 70 plus participants as they initiate additional climate outreach programs in their states and regions. *[I/PIU-11 (cli)]*

581 SOUTH CAROLINA: SC Sea Grant extension activities promote community understanding of coastal issues and how they can be managed.

Assistance with Comprehensive Land-Use Planning: As part of CGI, a small grants program, the S.C. Coastal Community Initiative Grant Program (SCCCI) was established to provide an incentive to engage local governments in the development and implementation of â€œequality growthâ€ land management policies and practices. Two important objectives of this grant program are for participating coastal

communities to make a commitment to working with the SCSGEP to understand â€œquality growthâ€ principles and to seriously consider incorporating one or more of these principles into local land use plans and policies. On a yearly basis, proposals have been solicited from coastal municipalities and counties to participate and to date, six coastal communities have received SCCCI grants ranging from $2500 to $5000 to address a variety of issues related to related to open space preservation, natural resource-based planning, water quality management, alternative transportation, sustainable community planning and design, and zoning ordinances and regulations. Since the inception of the SCCCI more than $60,000 has been leveraged by the communities participating in the grants initiative Maintain Existing and Establish New Linkages and Collaborative Partnerships: The S.C. Coastal Information Network (SCCIN) emerged as a result of a number of coastal outreach institutions and constituencies working in partnership to enhance coordination of the coastal community outreach efforts in South Carolina. This organized effort, led by the S.C. Sea Grant Extension Program and coordinated by the Coastal Communities Specialist, includes partners from federal and state agencies, regional government agencies and private organizations seeking to coordinate and/or jointly deliver outreach programs that target coastal community issues. The purpose of this collaboration is to avoid duplication of efforts and minimize the number of meetings/workshops that community leaders and staff are asked to attend, leverage scarce resources, maximize program benefits and expected outcomes. To facilitate communication and coordination, Network partners have created a member list serve and developed a web site (www.sccoastalinfo.org) with a searchable database calendar of all participating partnersâ€™ outreach events in coastal South Carolina SCNEMO and Other Related Water Resources Management Programs: The CC specialist is the outreach project coordinator for the Biennial Sea Grant Program project, â€œAn Assessment of Stormwater Best Management Practices for Coastal South Carolina: The Oak Terrace Preserve Monitoring Projectâ€. The project purpose is to evaluate the efficiency and efficacy of innovative stormwater management practices and these evaluations will be used to improve the understanding of hydraulic changes through construction phasing (which is significant to developing regional stormwater management techniques). The outreach team members are tasked with promoting public awareness and understanding of watershed concepts and the link between development and water quality through outreach education programs and products. As coordinator of the outreach component of the project, the CC specialist has been involved in the development of NPS fact sheets, focus group workshops, and bioswale demonstration workshops. The SCNEMO Team continued the process of revising the SCNEMO Program, with particular attention being paid to enhancing the programâ€™s principles and strategies with local scientific research (science infusion). The CC specialist with the help of the Assistant Director of Research and Planning organized and convened a meeting with local scientists to discuss how to infuse/incorporate their research results and information into the SCNEMO program. Coastal Access/Waterfront Diversity Investigative Study: In collaboration with the S.C. Sea Grant Extension Program Fisheries Extension specialist and a contracted marine resource economist (Ray Rhodes), the CC specialist contributed to a study investigating water access challenges and opportunities for water dependent marine fishing stakeholders - both commercial and recreational. Conducted an in-depth study investigating the current state of waterfront access for commercial and recreational fishing stakeholders in coastal South Carolina. The study included an extensive literature search and compilation, as well as one-on-one interviews with diverse stakeholders including commercial and recreational fishermen, state-level fishery managers and coastal resource managers, county-level planning staff, commercial fishing dock owners and recreational fishing pier operators. The goals of the study were to determine the current state of waterfront access in coastal S.C. and any surrounding waterfront access issues, to provide examples of local waterfront access initiatives occurring in the state, and to identify existing and new tools for addressing waterfront access issues in the state. The study was completed in 2008 and the report is available for download from the S.C. Sea Grant Web site. â€œThe Waterfront Access Reportâ€ - outlined current trends in waterfront access for

commercial and recreational fishing/boating sectors, as well as coastal development trends. Based on stakeholder interviews, summaries of current S.C. initiatives and the tools used to implement maintenance or preservation of waterfront access for fishing purposes were compiled. Also as part of the report, a comprehensive resource list of other waterfront access initiatives across the nation was compiled and a glossary of acquisition-based and non-acquisition based tools used by communities was developed. South Carolina Nature-Based Tourism Association (SCNBTA): The CC specialist continued to interact with the SCNBTA members, attending annual board meetings, as well as SCNBTA annual conferences, and seminars during the reporting period. The CC specialist continued to serve on the SCNBTA Board of Directors (since 2007), as well as the conference/workshop planning committee. The CC specialist is responsible for coordinating the newly redesigned Web site, which includes generating and distributing monthly and quarterly Web site statistical analysis reports and monitoring the site for broken links and necessary updates. Linking Land-Use Planning with Hazards Planning: The CC specialist continued to participate on two of the Charleston County Project Impact Committees throughout the project period. The S.C. Coastal Information Network (SCCIN) is in the preliminary stages of organizing three information sessions for coastal decision-makers in the upcoming months to discuss the potential impacts of shoreline change in South Carolina, including beachfront and estuarine shorelines. Experts on shoreline change will present the current status of climate, sea level, and shoreline change in South Carolina and initiate a public discussion and exchanging of ideas at the local level. Following the informative presentations and facilitated breakout group sessions, participants will identify the next steps to help prepare communities for the impacts of shoreline change. *[A/CG-1 (cli wq mon)]*

110 ALASKA: Sea Grant-NOAA research studied the ecological role of marine mammals and their response to a changing environment

Activity Summary: Alaska Sea Grant supported MAP's marine mammal specialist while collaborating on the Gulf Apex Predator-prey project, a NOAA-funded study of the seasonal and interannual variability in prey availability and use by Kodiak's apex marine predators. Results showed that the diets and distribution of Kodiak's endangered marine mammals are diverse and flexible, responding to temporal changes in environmental conditions and local prey availability. Impact Statement: Ecosystem-based marine resource management relies on understanding both the structural components of the system and the functional mechanisms of their interactions. By monitoring the seasonal distribution and abundance of predators and their prey, GAP studies have illuminated how changes in coastal climate and commercial harvests may affect endangered marine mammals and other apex predators in Alaskan waters. As a multi-year study, GAP is developing the time-series needed to explore and anticipate effects of environmental change on primary and secondary production in a coastal marine ecosystem. *[(ebm mod cli end)]*

1588 WASHINGTON: Sea Grant Develops New Ecosystem Model to Manage California Current Fisheries

Many West Coast fisheries, their resources, and the port communities they support have collapsed in recent decades. Sea Grant research has developed a bioeconomic model for the California Current ecosystem – one that quantifies resilience and tradeoffs among marine ecology, regional economics, and climate interactions within the ecosystem. Impact: The Pacific Fishery Management Council (PFMC) is using the model in its management process to address development of marine protected areas, fleet capacity reductions, rebuilding of overfished groundfish and salmon stocks, and the relationship between sustainable fishing communities and the coastal marine ecosystem. The model allows managers to better account for dynamic linkages among the ecosystem, socio-economics, and management of the fishery, as well as ecological complexity and spatial variability. *[R/F-145 (prot ebm cli mod)]*